art would expect even poorer runability if both pigments are used. Unexpectedly, if **both** the inorganic pigment **and** the hollow sphere synthetic pigment having a specific diameter range are added to a coating color, the coating runability will be improved so as to form a coating paper for gravure printing with good paper quality.

Next, the disclosures of each of the cited documents will be compared with the present invention.

(2) Comparison of the present invention with each of the cited documents

(a) JP-A-2002-88679 (Kai)

Kai provides a coated paper for gravure printing which has a coating layer containing a specific amount of kaolin as a pigment, in which 65% or more of particles are in the particle diameter range of from 0.4 to 4.2 μm based on volume, and a copolymer latex having a glass transition temperature regulated to -50°C to 0°C.

Kai describes kaolin (a pigment) in which 65% or more of particles are in the particle diameter range of from 0.4 to 4.2 μm based on volume. Concerning an organic pigment, paragraph 0006 of Kai discloses as follows:

> On the other hand, a method is known from JP S64-20396A to use organic pigments, such as a plastic pigment, to give high sheet gloss, opacity, and the like, and to prevent a speckle. However, organic pigments are expensive as compared with inorganic pigments. Moreover, the viscosity of a coating color containing an organic pigment under high shear force is apt to increase, which can result in streak and scratch.

As Kai stated above, it is clear that a coating color containing an organic pigment has poor coating runability. Namely, Kai identifies the disadvantages/problems of adding an organic pigment to kaolin as a pigment, in which 65% or more of particles are in the particle diameter range of from 0.4 to 4.2 μm based on volume. Accordingly, a combination of the specific inorganic pigment and specific hollow sphere (organic) synthetic pigment, as in the present invention, goes against the teachings of Kai.

Further, the specification of the present invention states as follows (line 23, page 5 to line 7, page 6):

> "In JPA 2002-88679 (Kai), we showed that rotogravure coated papers having low density, high sheet gloss and improved gravure printability such as speckles were obtained by using kaolin having a volume-based distribution in which 65 % or more of particles are in the

particle diameter range of 0.4-4.2 μm as a pigment in the coating layer in an amount of 50 parts by weight or more in 100 parts by weight of the total pigment composition and a latex copolymer having a glass transition temperature of -50 to 0 °C as an adhesive. However, stalactites, scratches, streaks, etc. sometimes occurred at coating speeds of 600 m/min or more, resulting in poor coating runability."

The inorganic pigment of the present invention has a volume-based distribution in which 65 % or more of the particles are in the particle diameter range of 0.4-4.2 μm. This particle size distribution is narrow, and a coating color containing the inorganic pigment having such distribution has high viscosity. Accordingly, it is not easy to coat a base paper and coating runability will become worse.

The coating speed was 500 m/min in Example 1 in Kai, while in contrast it is reported that an excellent coating suitability could be established in the Example of the present invention even at a coating speed of 800 or 1100 m/min. Further, the coated paper according to the present invention has an excellent coating runability, a low density, a high sheet gloss, a high print gloss, and a good suitability for gravure printing.

Such being the case, the present invention clearly differs from Kai in two problems to be solved, constitution and advantages.

(b) JP-A-2002-161494 (Matsumura)

Matsumura provides a gravure printing paper with high gloss which is obtained by coating a basal paper with a coating liquid containing an organic hollow pigment of from 0.2 to 0.5 μm in particle diameter and delaminated clay having an aspect ratio of from 30 to 60 followed by drying and then subjecting the thus coated paper to supercalendering.

Although Matsumura is common to the present invention in using an organic hollow pigment of from 0.2 to 0.5 μm in particle diameter, no reference is made therein to an inorganic pigment in which 65 % or more of particles are in the particle diameter range of from 0.4 to 4.2 μm based on volume, as specified in the present invention.

In Example 1 in Matsumura, more specifically, an inorganic pigment consisting of 70 parts of delaminated clay (Hydraprint available from Huber Corporation), 20 parts of clay (Ultra White 90 available from Engelhard Corporation) and 10 parts of calcium carbonate (FMT-90 available from Fimatec Ltd.) is described. Concerning this composition, an inorganic pigment of

the same type was employed in Comparative Example 1[1] of the present invention and its composition ratio was closely similar to the one described above. Namely, it is stated in Comparative Example 1 of the present invention that an inorganic pigment consisting of "70 parts of high-grade clay (Ultra White 90 available from Engelhard Corporation, volume distribution in the particle diameter range of 0.40-4.20 μm: 59.8%), 20 parts of delaminated clay (Hydraprint available from Huber Corporation, volume distribution in the particle diameter range of 0.40-4.20 μm: 53.2%), and 10 parts of calcium carbonate (FMT-90 available from Fimatec Ltd., volume distribution in the particle diameter range of 0.40-4.20 μm: 71.9%)" was employed. From this it can be easily estimated that the inorganic pigment of the Example in Matsumura differs from the inorganic pigment having 65% or more of particles in the particle diameter range of from 0.4 to 4.2 μm based on volume as specified in the present invention. Concerning the inorganic pigments, therefore, the present invention obviously differs from Matsumura.

From the viewpoint of advantages, the gravure coated paper of Comparative Example 1 of the present invention, which corresponds to the high-gloss paper for gravure printing of Matsumura, has a poor coating suitability, suffers from a problem in coating runability and is inferior in sheet gloss, print gloss and suitability for gravure printing – deficient in all five categories.

Such being the case, the present invention clearly differs from Matsumura in the problems to be solved, constitution and advantages.

(c) JP-A-H11-279990 (Sasaki)

Sasaki relates to a coated paper for gravure printing, the coating layer of which contains specific amounts of a hollow polymer particle, a non-alkali thickening type styrene-butadiene latex and a specific amount of starch esterified with phosphoric acid. In Sasaki, although a hollow organic pigment is disclosed, there is no disclosure or suggestion to use an inorganic

[1] The evidence of unexpected results as shown by the data provided in an originally filed specification provide sufficient basis for demonstration of a surprising and synergistic results. The results presented in the original specification accompanied by the executed declaration signed by the inventors would have significant evidentiary weight, comparable to the weight given to an executed declaration. It is well established by the Federal Circuit that "the examiner must consider comparative data presented in the specification which is intended to illustrate the claimed invention in reaching a conclusion in regard to the obviousness of claims." *In re Margolis,* 785 F.2d 1029, 228 U.S.P.Q. 1123, 1129 (Fed. Cir. 1993).

pigment in which 65% or more of particles are in the particle diameter range of from 0.4 to 4.2 μm.

Paragraph [0018] of Sasaki states as follows:

> "However, when a hollow polymer particle is used, the viscosity, especially the high shear viscosity, of a coating color is apt to increase. In particular, when a hollow polymer particle is used to combine an alkali thickening type styrene butadiene latex, it thickens remarkably and tends to generate streaks by use of a blade coater, and the coated paper for gravure printings will be produced, which has a problem in coated paper surface."

Paragraph [0023] of Sasaki states as follows:

> "For this reason, by use of non-alkali thickening type styrene butadiene latex as a latex, the high shear viscosity is reduced and a blade coater runability is improved. However, since the improvement of blade coater runability is insufficient, a small amount of starch esterified with phosphoric acid is added to the coating color."

As stated in [0023], it is understood from Sasaki that when hollow polymer particles are added to a coating color, there are disadvantages of coating runability. Accordingly, in Sasaki, disadvantages are counteracted by the addition of the other components to the coating color.

Thus, the hollow polymer particles described in Sasaki cannot be easily applied to the present invention. A person having ordinary skill in the art would not think of the combined use of the specific inorganic pigment and specific hollow sphere (organic) synthetic pigment, as in the present invention.

(d) JP-A-2001-288690 (Ryu)

Ryu provides a flexible printing paper containing a low-density filler having a bulk specific gravity of 0.3 g/ml or less with urea.

Since Ryu's printing paper has no coating layer containing such a pigment as specified in the present invention, it corresponds not to the coated paper according to the present invention but to a so-called **un**coated paper. Accordingly, it completely differs from the coated paper of the present invention where a coating layer containing an inorganic pigment in which 65% or more of particles are in the particle diameter range of from 0.4 to 4.2 μm and an organic (synthetic) hollow pigment having a mean particle diameter of from 0.1 to 0.6 μm is formed. Thus, Ryu also differs from the present invention in problems to be solved and advantages.

Such being the case, the present invention clearly differs from Ryu in problems to be solved, constitution and advantages.

(3) The present invention and combinations of Kai, Matsumura, Sasaki and Ryu

A problem to be solved by the present invention is to provide a coated paper for gravure printing having an excellent coating runability, a low density, a high sheet gloss, a high print gloss, fewer missing dots and a good suitability for gravure printing. This problem can be solved by providing a coating layer that contains an inorganic pigment having a volume-based distribution in which 65% or more of particles are in the particle diameter range of from 0.4 to 4.2 μm and an organic (synthetic) hollow pigment having a mean particle diameter of from 0.1 to 0.6 μm.

Kai provides no description on an improvement in the coating runability and a high printing gloss, i.e., the problem to be solved by the present invention. From the viewpoint of components used, Kai is common to the present invention in using kaolin (a pigment) in which 65% or more of particles are in the particle diameter range of from 0.4 to 4.2 μm based on volume.

As explained above, concerning an organic pigment, paragraph [0006] of Kai cautions that organic pigments are expensive as compared with inorganic pigments, and the viscosity of a coating color containing an organic pigment under high shear force is apt to increase, resulting in becoming a factor to bring about streak and scratch. Namely, the knowledge of [0006] of Kai teaches away[2] from the present invention. In addition, Kai does not suggest the reader to use an organic (synthetic) hollow pigment having a small particle diameter which is "hollow" and has a mean particle diameter of from 0.1 to 0.6 μm as specified in the present invention.

Therefore, it is never stated or suggested in Kai that the coating runability of the level of the present invention can be improved. Furthermore, the print gloss in KAI is not so high compared with the sheet gloss. For example, the coating speed was 500 m/min in Example 1 of

[2]An important consideration in determining obviousness is "teaching away" from the claimed invention by the prior art. *In re Dow Chemical Co.*, 837 F.2d 469, 473 (Fed. Cir. 1988). A reference teaches away when a person of ordinary skill, upon reading the reference, would be discouraged from following the path set out in the reference, or would be led in a direction divergent from the path that was taken by the applicant. A reference will teach away if it suggests that the line of development flowing from the reference's disclosure is unlikely to be productive of the result sought by the applicant. *In re Gurley*, 27 F.3d 551, 553 (Fed. Cir. 1994); *see also KSR*, 127 S. Ct. at 1739–40 (explaining that when the prior art teaches away from a combination, that combination is more likely to be nonobvious).

KAI, while it is indicated that an excellent coating suitability could be established in the Example of the present invention even at a coating speed of 800 or 1100 m/min. Further, the coated paper according to the present invention has a low density, a high sheet gloss, a high print gloss and a good suitability for gravure printing.

Such being the case, the present invention clearly differs from Kai in problems, constitution and advantages.

The constitutional difference between Kai and the present invention resides in the fact that an organic (synthetic) hollow pigment having a small particle diameter, i.e., a mean particle diameter of from 0.1 to 0.6 μm is used in the present invention whereas no such organic (synthetic) hollow pigment is used in Kai. Owing to the combined use of an inorganic pigment having a distribution in which 65% or more of particles are in the particle diameter range of from 0.4 to 4.2 μm with an organic (synthetic) hollow pigment having a small particle diameter, namely, an excellent coating runability (preferably at a coating speed of 600 m/min or higher, more preferably at a coating speed of 1000 m/min or higher – as stated in claim 6) can be achieved, and other qualities also become excellent. In Matsumura, in contrast, it is mentioned to use an organic hollow pigment of from 0.2 to 0.5 μm in particle diameter. However, it is neither mentioned nor suggested that the coating runability becomes excellent thereby (in Matsumura, evaluation was conducted exclusively at a coating speed of 450 m/min). It is neither mentioned nor suggested that the sheet gloss and print gloss are elevated or the missing dots are reduced. So how could a person skilled in this art easily conceive of the present invention based on the combination of Kai with Matsumura? Ryu relates **not** to a coated paper having a coating layer containing a pigment but to an **uncoated** paper provided with a pigment-free coating layer. Namely, Matsumura differs from the present invention in the paper type and hence is not analogous art.

Paragraph [0018] of Sasaki states that when a hollow polymer particle is used, the viscosity, especially the high shear viscosity, of a coating color is apt to increase. Thus, the hollow polymer particles described in Sasaki cannot be easily incorporated into the present invention. Although it is stated in Sasaki to employ hollow polymer particles having a diameter of from 0.4 to 2.0 μm, the hollow polymer particles employed in the Example had a diameter of 1.0 μm that is excluded from the scope as defined in the present invention (much too large).

Moreover, it was reported that the coating runability was worsened by use of these particles. Therefore, one of ordinary skill in this art would not be suggested to make the combination of Kai with Sasaki.

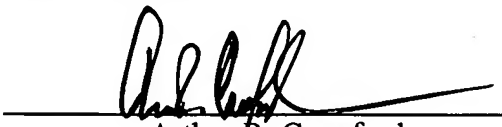
As discussed above, a person skilled in the art can hardly conceive of the constitution of the present invention on the basis of Kai or the combinations thereof with Matsumura, Sasaki and Ryu. Even though Kai to Ryu are combined together, it is neither mentioned nor suggested that the excellent coating runability of the present invention can be thus achieved. Further, it is neither mentioned nor suggested that the sheet gloss, the print gloss and the dot reproducibility can be improved thereby.

Such being the case, it is apparently difficult to easily conceive of the present invention based on Kai, Matsumura, Sasaki and Ryu.

For the above reasons it is respectfully submitted that the claims of this application define inventive subject matter. Reconsideration and allowance are solicited.

Respectfully submitted,

NIXON & VANDERHYE P.C.

By: 

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